AMENDMENT TO THE CLAIMS

1. (currently amended) A method of processing a multi-dimensional signal with arbitrarily shaped domain via a multi-scale transform comprising the steps of:
   a. Obtaining the multi-dimensional signal; and
   b. Performing a domain adaptive transform on the signal, wherein the domain adaptive transform [[is]] comprises a transform in which ~~rules of representation are~~ a convolution operator is applied to process pixels near a boundary of the domain ~~which differ from the rules of representation~~ but is not applied to process pixels in an interior of the domain.
2. (currently amended) A method of processing all or a portion of a multi-dimensional signal with a domain composed of a collection of arbitrarily shaped domains via a multi-scale transform comprising the steps of:
   a. Obtaining a multi-dimensional digital image frame;
   b. Breaking the image frame into constituent arbitrary shaped domains, or given such a set, that cover all or a portion of the original multidimensional signal domain; and
   c. Performing a domain adaptive transform on one or more of the collection of arbitrary shaped domains, wherein the domain adaptive transform [[is]] comprises a transform in which ~~rules of representation are~~ a filter comprising a convolution operator is applied to process pixels near a boundary of the domain ~~which differ from the rules of representation~~ but is not applied to process pixels in an interior of the domain.
3. (currently amended) A method of encoding all or a portion of a multi-dimensional signal with an arbitrarily shaped domain or all or a portion of a multi-dimensional signal via a multi-scale transform comprising the steps of:
   a. Obtaining the multi-dimensional signal;
   b. Performing the domain adaptive transform on the signal, wherein the domain adaptive transform [[is]] comprises a transform in which ~~rules of representation are~~ a filter comprising convolution operator is applied to process pixels near a

boundary of the domain ~~which differ from the rules of representation~~ but is not applied to process pixels in an interior of the domain;

c. Quantizing the resultant decomposition coefficients; and

d. Encoding and transmitting the quantized values over an information channel to a decoder for reconstruction of an approximated signal.

4. (currently amended) A method of processing all or a portion of a multi-dimensional signal with a domain composed of a collection of arbitrarily shaped domains via a multi-scale transform comprising the steps of:

a. Obtaining a multi-dimensional digital image frame;

b. Breaking the image frame into constituent arbitrary shaped domains, or given such a set, that cover all or a portion of the original multidimensional signal domain;

c. Performing the domain adaptive transform, wherein the domain adaptive transform [[is]] comprises a transform in which ~~rules of representation are~~ a filter comprising a convolution operator is applied to process pixels near a boundary of the domain ~~which differ from the rules of representation~~ but is not applied to process pixels in an interior of the domain;

d. Quantizing the resultant decomposition coefficients; and

e. Encoding and transmitting the quantized values over an information channel to a decoder for reconstruction of an approximated signal.

5. (currently amended) A method of processing a multi-dimensional signal via multi-scale transform comprising the steps of:

a. Obtaining the multi-dimensional signal; and

b. Performing a pattern adaptive transform on the signal, wherein the pattern adaptive transform ~~is a transform~~ comprises an interpolation filter that adapts to different patterns present in the multi-dimensional signal.

6. (original) The method of claim 2 where step b comprises of a combined domain and pattern adaptive transform.

7. (original) The method of claim 3 where step b comprises of a combined domain and pattern adaptive transform.

8. (previously presented) The method of claim 4 where step c comprises of a combined domain and pattern adaptive transform.

9. (previously presented) The method as in claim 3 where instead of transmitting over an information channel the encoded data is placed onto a storage apparatus or mechanism for the purpose of efficient storage and later decoding.
10. (previously presented) The method as in claim 3 where instead of directly quantizing the resultant decomposition coefficients and then encoding, the coefficients are passed through a bit-plane encoder.
11. (original) The method as in any one of claims 1 or 5 where the multi-dimensional signal is comprised of multiple color or intensity components.
12. (original) The method of claim 11 where the signal is 2-D and there are three color components and these represent Y, U, and V.
13. (original) The method of claim 11 where the signal is 2-D and there are three color components and these represent R, G, and B.
14. (original) The method of claim 11 where the signal is 2-D and there are three color components and these are any orthogonal color components.
15. (original) The method as in any one of claims 2 or 6 where the multi-dimensional image frame is a still image frame.
16. (original) The method as in any one of claims 2 or 6 where the multi-dimensional image frame is an infra-frame for a sequence of video images.
17. (original) The method as in any one of claims 2 or 6 where the multi-dimensional image frame is a residue frame for a sequence of video images.
18. (previously presented) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied during the calculation of coarser scale representations in a forward transform of a multi-scale transform.
19. (previously presented) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied during the estimation of next finer scale representations in an inverse transform of a multi-scale transform during the reconstruction phase either in conjunction with or irrespective of the use of the method in claim 18.
20. (original) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied in order to construct a sub-band decomposition of a multi-scale transform.
21. (previously presented) The method as in any one of claims 18, 19, or 20 where instead of the domain adaptive transform, a pattern adaptive transform is used.

22. (original) The method of claim 20 where instead of the domain adaptive transform, a combined pattern and domain adaptive transform is used.
23. (previously presented) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied during the estimation of the next finer level of sub-bands in a multi-scale transform during a reconstruction phase.
24. (original) The methods of claims 19 or 23 where the domain adaptive transform is applied either with or without the presence of quantization or bit-plane pruning.
25. (currently amended) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied such that the points external to the arbitrary domain but within [[the]] support of a filter (or filters) are excluded from a mathematical result of a convolution or weighted average / difference.
26. (previously presented) The method as in any one of claims 1 or 6 where the domain adaptive transform is applied such that points external to the arbitrarily shaped domain but within support of the filter (or filters) are included in a mathematical result of a convolution or weighted average / difference but are further multiplied (or reweighted) by another set of weighting factors.
27. (previously presented) The method of claim 26 where the set of additional multiplicative factors is determined as a result of calculation of a local measure characterizing a transition at a boundary of the arbitrary domain.
28. (previously presented) The method of claim 27 where the measure is based on a statistical function of a plurality of pixel value differences across the boundary transition.
29. (original) The method of claim 28 where the statistical function is the mean.
30. (original) The method of claim 28 where the statistical function is the median.
31. (original) The method of claim 28 where the statistical function is based on a weighted average.
32. (previously presented) The method of claim 28 where the statistical function is based on a weighted average with coefficients that are nonlinear functions of pixel values.
33. (previously presented) The method of claim 28 where the statistical function is a pre-determined constant.
34. (previously presented) The method of claim 26 where the set of additional

multiplicative factors is determined as a result of calculation of a local measure characterizing a transition at the boundary of the arbitrarily shaped domain and the calculation of the local measure is dependent on data which is available to a decoder at the time of an operation when envisioned as part of an inverse transform or reconstruction phase of a multi-scale transform.

35. (original) The method of claim 34 where the calculation of the local measure is based on one or more coarser scales of representation of the signal which have already been decoded and thus made known to the decoder by the time of the inverse transform step.

36. (original) The method of claim 34 where the calculation of the local measure is based on a motion compensated model frame (or equivalent) that has already been decoded and thus made known to the decoder by the time of the inverse transform step in the context of a encoder-decoder system related to the efficient transmission or storage of a sequence of video data.

37. (previously presented) The method as in any one of claims 25 or 26 where a function for renormalization, i.e. replacement of the missing filter coefficients, is accomplished by a statistical function of remaining pixel values which are located at points contained within the arbitrary shaped domain.

38. (original) The method of claim 37 where the statistical function is based on the median.

39. (original) The method of claim 37 where the statistical function is a mean.

40. (original) The method of claim 37 where the statistical function is a weighted average.

41. (original) The method of claim 40 where the statistical function is a weighted average with coefficients that are nonlinear functions of the data values themselves.

42. (original) The method of claim 37 where some form of outlier rejection is used to ensure that outliers remaining inside the intersection of the domain and the filter support do not disrupt the local accuracy or efficiency of the transform.